

# ENVIRONMENTAL IMPACT ASSESSMENT

FOR PROPOSED EXPLORATION ACTIVITIES ON EPL 6773, 7440, 7423, 7442 &  
7718 AROUND SESFONTEIN AREA  
KUNENE REGION



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## **DOCUMENT AUTHENTICATION**

This Environmental Impact Assessment project report has been prepared by Eco-Wise Environmental Consulting cc in accordance with the Environmental Management Act No 7 of 2007 (EMA) and its regulations of 2012, which requires that every mining related project must have an EIA report prepared for submission to the Ministry of Environment Forestry and Tourism-Division of Environmental Affairs. We the undersigned, certify that the particulars in this report are correct and righteous to the best of our knowledge.

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## **ENVIRONMENTAL AUTHORIZATION INFORMATION**

Please note that the environmental clearance certificate should be issued out to the client. All comments and enquiries during the evaluation of this document must be addressed to the Environmental Consultants. Please forward the clearance certificate to the consultant.

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**ACRONYM**

<b>ACRONYM</b>	<b>MEANING</b>
BID	Background Information Document
EIA	Environmental Impact Assessment
EAP	Environmental Assessment Practitioner
EMP	Environmental Management Plan
EPL	Exclusive Prospecting License
I&APs	Interested and Affected Parties
LTD	Limited Company
PPP	Public Participation Process
PTY	Proprietary
ToR	Terms of Reference

## EXECUTIVE SUMMARY

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### **Proponent**

Exploration activities shall be conducted on the following EPLs 6773, 7440, 7423, 7442 & 7718 around Sesfontein area, Kunene Region. The Proponent for the project shall be Kaoko Mining Namibia (Pty) Ltd, a registered Namibian company. The company has thirty-three shareholders who grouped their licenses together in order to explore for potential deposits. The areas to be explored, might have different minerals but the proponent is mainly aiming to discover, copper of medium to large minable deposits. Given that a discovery of copper deposit is found, it may form an alternative source of concentrate for the Tsumeb smelter.

### **Environmental Assessment Consultants**

Eco-Wise Environmental Consulting cc was appointed by Kaoko Mining Namibia (Pty) Ltd to conduct this Environmental Impact Assessment (EIA). The EIA study was carried out according to the requirements of the Environmental Management Act (Act No.7 of 2007) and its regulations of 2012.

### **Environmental Impact Assessment**

This is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse. The Environmental Consultants undertook this EIA study, to predict the impacts of the proposed activity on the environment and to propose mitigation measures. The EIA covered the following aspects; project description, baseline studies, public participation process, environmental, socio-economic impact assessment and environmental management. All identified impacts were addressed and mitigation measures were brought forward.

### **Objectives of the EIA**

The main objective of the study was, to identify environmental and socio-economic impacts associated with exploration activities and to propose mitigation measures.

#### **Specific objectives included:**

- To determine the potential environmental impacts derived from exploration activities.
- To establish baseline environmental conditions so that relevant impacts could be projected and sufficient mitigation measures could be designed
- To consult with key, interested and affected stakeholders so that their concerns are considered in the formulation of the EIA report and implementation of the Environmental Management Plan
- To propose alternative measures where it is noticed that adverse effects may occur and to set up an Environmental Management Plan that will govern all activities of the project for the better protection of the environment.

### **Environmental Impact Assessment Methodology**

Methods used to gather information during this study include; desktop studies, observations through site visit, public meetings, advertisement, secondary data collection and distribution of questionnaires and letters.

During the assessment it was observed that the project will be associated with both positive and negative impacts. Positive impacts associated with the project include employment creation, land utilization for the benefit of people and empowerment of locals. The main findings obtained from the assessment showed that the project will have more positive impacts in future thus during mining phase. Positive impacts which will likely happen in future include transfer of skills, employment creation, community development and boosting Namibia's copper supplies and mineral exports. However, the project might also have negative impacts on the landscape, soil, fauna, flora, employees working around the sites and generation of waste.

### **Draft Scoping Report**

The draft scoping report was made available to the public for commenting. The draft report included all comments raised during the public meetings. All impacts identified through the site visit, professional expertise and comments from the public were incorporated in the report. An Impact Assessment matrix was used to establish the environmental risk of the overall project. An Environmental Management Plan with proposed mitigation measures for the identified impacts was also developed.

### **Final Scoping Report and EMP**

The final report was sent to the proponent, Kunene Regional Council, Ministry of Mines and Energy and Ministry of Environment Forestry and Tourism: DEA for review.



## CHAPTER ONE: BACKGROUND

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### 1.1 INTRODUCTION

The Proponent being Kaoko Mining Namibia (Pty) Ltd proposes to conduct exploration activities on the following EPLs' 6773, 7440, 7423, 7442 & 7718 around Sesfontein area, Kunene Region. Kaoko Mining Namibia (Pty) Ltd is owned by local individuals who grouped their licenses together. **See Appendix C**, Agreement for transfer of the EPLs from the shareholders to Kaoko Mining Namibia (Pty) Ltd. All the EPLs listed were checked on the Ministry of Mines and Energy portal and were found not to be falling under environmental sensitive areas or withdrawn areas.

The Proponent appointed Eco-Wise Environmental Consulting to conduct the EIA. Eco-Wise Environmental Consulting cc conducted a site visit on 26/10/2019. The consultant was mainly guided by the Environmental Management Act (No. 7 of 2007) and Environmental Impact Assessment Regulations (2012) during the process of the EIA. The Environmental Impact Assessment Regulations (2012) states all the activities, which require an Environmental Impact Assessment and among the listed activities is annexure 3, mining and quarrying activities where this project is classified under. Annexure 3.2 states that other forms of mining or extraction of any natural resources whether regulated by law or not and 3.3 Resource extraction, manipulation, conservation and related activities require and EIA. The competent authority will be, Ministry of Environment Forestry and Tourism.

### 1.2 NEED FOR THE PROJECT

The project will promote local empowerment, if the project is successful, it will empower the local shareholders of the company. In addition, the motivation for Namibia to support the project is economic and strategic in nature. Given that, medium to large minable copper deposits are explored, this will boost Namibia's copper supplies and mineral exports thereby adding to Namibia's economy. In addition, the proponent will generate revenue for the government through taxes. Revenue generated through taxes will be used for economic development.

The project will create employment. Even though a few people will be employed during exploration phase if this initiative grows and ultimately develops into active mining, thousands of Namibians will get employment. During the exploration phase, mainly professionals with the expertise will be hired to explore the area. Casual labour might however be sourced from locals when the need arises.

The project also has a potential to bring local development especially if it is allowed to pass to mining phase. Generally, the area of Sesfontein is remote hence this project will have a potential to boost the development of the area. If a mine is established in future, this might likely lead to

upgrading of roads, establishment of infrastructure, increase of people which will have a consequence of increasing demand hence promoting local sells and products.

### **1.3 SCOPE OF THE PROJECT**

The scope of the study includes carrying out environmental investigations in line with current provisions on environmental legislations. The Environmental Management Act (No 7 of 2007) and its regulations of 2012 were used as guidelines for the EIA study. The report is aimed at identifying and evaluating environmental and socio-economic impacts associated with the project.

### **1.4 TERMS OF REFERENCE**

The approach to undertake the work was guided by the following ToR, which were provided by the proponent;

- Conduct environmental scoping.
- Determine all the possible environmental and socio-economic impacts of the project.
- Conduct a public participation process to gather the views of Interested and Affected Parties.
- Design an Environmental Management Plan with sound and relevant mitigation measures for monitoring purposes.
- Compile a full EIA report for submission to Ministry of Environment and Tourism and Ministry of Mines and Energy.
- Coordinate the whole application process of the Environmental Clearance Certificate until the issuance of the certificate.

### **1.5 OBJECTIVES**

The objectives of the study were derived from the ToR and they are as follows:

#### **1.5.1 General objective**

- To determine the potential environmental and socio-economic impacts derived from the exploration activities

#### **1.5.2 Specific Objectives**

- To establish baseline environmental conditions so that relevant impacts could be projected and sufficient mitigation measures could be designed
- To identify direct or indirect environmental impacts that may result from the proposed activity.
- To consult with key, interested and affected stakeholders so that their concerns are considered in the formulation and implementation of the Environment Management Plan.
- Comply with Namibia's Environmental Impact Assessment Regulations (2012), Environmental Management Act (No. 7 of 2007) and other relevant laws and regulations.

- To set up an Environmental Management Plan that will govern all activities of the project for the better protection of the environment.

## 1.6 METHODOLOGY USED FOR THE STUDY

- Desktop Study**- This involved review of documents and relevant legislatives. Documents containing geological, vegetation, climatic, demographic and hydrological data for Namibia were reviewed.
- Site Visits** –The EIA team visited the sites on 26/10/2019. The field visit was meant for inspections of the sites in order to gather information on the state of environment. 4x4 vehicles were used to cross check the sites.
- Advertisement**- adverts were placed twice in two local newspapers, The Namibian and New Era.
- Public Participation**- the consultant conducted public meetings, recorded minutes and distributed questionnaires to participants. The meetings were held on 02/11 2019 at Otwani Rural District Council at 10:00am, Sesfontein Conservancy at 14:00 and Otjapitjapi at 17:00.
- Mapping**- maps which include vegetation, hydrogeology and location were produced which were used to gather more information.
- Reporting**- all data gathered was used to compile an EIA and EMP report which was submitted to Ministry of Environment and Tourism and Ministry of Mines and Energy.

## 1.7 LAND OWNERSHIP

The land is under communal land, see Appendix C consent letters from the traditional authority. The owners of the EPLs were however allocated the EPLs by Ministry of Mine and Energy.

## 1.8 OVERVIEW OF EIA REPORT

The remaining part of this report has been designated for the following aspects;

- Project Description.
- Legal and Policy Analysis.
- Environmental Baseline.
- Public Consultation.
- Impact Identification and Analysis.
- Environment Management, Monitoring and Evaluation Plan.
- Conclusions and Recommendations.

## CHAPTER TWO: PROJECT DESCRIPTION

The following issues will be clarified under project description;

- Project location.
- Project activities.
- Project cost.

### 2.1 PROJECT LOCATION

The EPLs are located around the area of Sesfontein in Kunene Region. **See Appendix A**, Location Map. The coordinates for the location of the EPLs are as follows:

Table 1: coordinates for the EPLs

EXCLUSIVE PROSPECTING LICENCE (EPL)	AREA (HECTARES)	Communal Conservancy	COORDINATES				Middle Point
			Corner 1	Corner 2	Corner 3	Corner 4	
6773	12116.8657	Okangundumba, Ozondundu, Otjambangu, Otjikondavirongo	18° 49' 34" S 13° 34' 27" E	18° 49' 34" S 13° 38' 11" E	18° 55' 23" S 13° 43' 49" E	18° 55' 08" S 13° 34' 24" E	18° 52' 13" S 13° 37' 22" E
7440	19974.8864	Anabeb, Ozondundu	19° 00' 01" S 13° 46' 37" E	19° 00' 03" S 13° 55' 36" E	19° 07' 36" S 13° 52' 11" E		19° 3' 07" S 13° 50' 16" E
7718	13060.5647	Okangundumba, Ozondundu, Anabeb, Sesfontein, Otjambangu, Otjikondavirongo	18° 55' 11" S 13° 34' 31" E	18° 55' 26" S 13° 43' 50" E	18° 59' 55" S 13° 46' 30" E		18° 57' 16" S 13° 40' 29" E
7442	19972.0116	Anabeb, Ozondundu, Omatendeka	19° 00' 01" S 13° 48' 07" E	19° 00' 01" S 13° 56' 29" E	19° 07' 13" S 13° 54' 53" E	19° 07' 06" S 13° 47' 45" E	19° 3' 17" S 13° 51' 50" E
7423	19960.6526	Sesfontein, Anabeb	19° 00' 06" S 13° 38' 39" E	19° 00' 01" S 13° 46' 26" E	19° 07' 34" S 13° 46' 24" E	19° 07' 34" S 13° 38' 36" E	19° 3' 38" S 13° 42' 09" E

### 2.2 PROJECT ACTIVITIES

Exploration is a stage of investigating or examining about the geological condition of an area. The main aim at this stage is to find high quality ore. During the phase of exploration, the Proponent will not conduct any construction activities and existing roads will be used hence reducing the impact of clearing vegetation. Roads in bad conditions will be upgraded and where EPLs are inaccessible, cut lines will be created for accessibility of vehicles.

### **2.2.1 RESEARCH AND RECONNAISSANCE**

The Proponent will have to firstly conduct a research using i.e survey of existing literature, examination of aerial photographs and satellite imagery alongside acquisition of geophysical data and geological maps of the prospective region. The desktop information is used to generate a geological model on which all the future exploration activities will be based.

Reconnaissance will be done whereby Mr David an employee of Kaoko Mining Namibia (Pty) Ltd will walk around the EPLs so as to try and identify areas with ore deposits. In a case that Mr David identifies a potential area, Mr Arno (geologist) will further verify. During this stage, prospectors will only look in the rocks thus for useful minerals and other clues to where a deposit may be hidden. The main purpose of carrying a reconnaissance is to reduce the areas of study by identifying select ones for further studies.

### **2.2.2 TRENCHING AND DRILLING**

Where mineralisation occurs close to surface, trenching can be utilised to obtain samples, help establish structural controls and delineate the potential resource. This is a cost-effective method compared to drilling. Kaoko Mining Namibia intends to use limited trenching and also drilling. Trenching will be carried out to expose the ore body near to the surface and shovels and picks will only be used. Drilling will be used to have a better understanding of the subsurface geology. In a case that the ore deposits extend underneath, drilling will be used. Exploratory openings or boreholes will be drilled at closer intervals along the strike and also depth wise, to accurately determine the shape, size, disposition of ore and grade of ore body. Drilling will require water, which will be obtained from nearby villages.

### **2.2.3 GEOCHEMICAL SAMPLING AND ANALYSIS**

Samples will be collected during trenching and drilling and sent for chemical analysis/testing.

### **2.2.4 MAPPING**

A map will be produced showing areas with potential deposits and such maps will be of great importance during the mining phase.

### **2.3 PROJECT COST**

The total funding required to set up the project is not yet established.

## **CHAPTER THREE: ANALYSIS OF ALTERNATIVES**

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The following chapter will focus on the alternatives to the project. Alternatives to the project are different options, other possibilities or other course of action, which can be adopted. The alternatives to the proposed project are:

**Option 1 – Alternative locations**

**Option 2 – No project alternative**

### Option 3 – Continue with the project

#### 3.1 ALTERNATIVE LOCATIONS

Option 1, which is alternative locations, implies that a different location to carry out the development must be acquired somewhere else other than the chosen site. Nevertheless, the fact that there are possibilities of copper deposits basing on past researches justify the use of the proposed sites for further studies.

#### 3.2 THE “NO PROJECT” ALTERNATIVE

Option 2, which is “no project alternative”, implies that the project must not be undertaken on the proposed land rather the land should remain undisturbed. However, the “no project alternative” will be less favorable from the socio-economic perspective. The “no project alternative”, will prevent employment creation and local empowerment. In addition, growth and development will also be prevented. If minable deposits are discovered and the proponent moves to the next phase of mining, the area will be developed in terms of infrastructure

#### 3.3 OTHER ALTERNATIVES

Initially, it was proposed that limited trenching shall be used and drilling when necessary. However, both methods will be used depending on the condition of the ground and the required depth. Table 3.1 below indicate the proposed methods. Table 3.2 also shows required services and their alternatives.

**Table 2:** exploration methods

<b>Method</b>	<b>Pros</b>	<b>Cons</b>
Limited Trenching	Ideal for understanding surface geology.	Difficult in areas with limited access
Drilling	<ul style="list-style-type: none"><li>-Easier installation in areas with limited access (under buildings, roads, railway tracks, hills, rivers, ponds, heavily-wooded areas)</li><li>-Ideal when one requires to understand subsurface geology</li><li>-Less impact on job site and public</li><li>-Reduced restoration costs due to minimal impact on land</li><li>-Maintains a cleaner job site</li><li>-Environmentally-friendly process</li></ul>	-Drilling is also not an option for shallow trenches less than 2 ft. deep.

**Table 3:** services alternatives

<b>Services</b>	<b>Proposed source</b>	<b>Alternative source</b>
Water	Local water sources from the nearby villages will be used.	Piping water from other sources out of the project area so as to supplement local water supplies.
Power for drilling	Diesel generators	Solar
Power for cooking	Gas stoves	Fire wood
Workers accommodation	Campsite on the nearby villages for geologist, assistant and drilling crew. Other employees for manual labor will be sourced from the nearest village.	Accommodation can be sourced from the nearest town which is Sesfontein.
Road (site accessibility)	EPLs to be accessed from C43 road (Opuwo Sesfontein road)	
<b>Waste Management</b>		
Sewage	Portable toilet to be used and these are advantageous because they are easy to transport and environmentally friendly (if properly disposed)	Ventilated improved pit (VIP) latrine.

### **3.4 ALTERNATIVES ASSESSMENT OUTCOMES**

The preferred option will be Option 3, which promotes the continuation of the project. Option 3, was viewed as beneficial given the benefits that come with the project. Furthermore, water for the proposed activity will be sourced from nearby villages. In cases that the water sources from the villages have low yields, water will be transported by trucks from other villages around the area. Apart from that, power for drilling will come from a diesel-powered generator. The route which comes from C43 will be used and no alternative route for access will be available. Portable toilets shall be used at the village and site where the contractor crew, geologist and assistant will be staying and working respectively. Portable toilets are easily transportable and environmentally friendly (if properly disposed).

## **CHAPTER FOUR: RELEVANT LEGISLATION**

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This chapter reviews various applicable legislations, which govern the project. The objective is to ensure that the proposed project compliances with Namibia's relevant laws, policies and regulations. The proponent shall be required to comply with the legislations. Where there is need to engage private consultants to facilitate compliance, the proponent is encouraged to consult qualified and certified personnel. The Environmental consultant is supposed to conduct legal compliance audits and produce bi-annual reports, which will be required during renewal of environmental clearance certificate. Table 4 below indicates laws and policies, which relates to the project.



**Table 4:** Relevant legislations related to the project

Aspect	Legislation	Relevant Provisions	Relevance to the Project
<b>The Constitution</b>	Namibian Constitution First Amendment Act 34 of 1998	<ul style="list-style-type: none"> <li>- According to article 91(c) it provides for duty to guard against “the degradation and destruction of ecosystems and failure to protect the beauty and character of Namibia”</li> <li>- Article 95 (l) deals with the “maintenance of ecosystems, essential ecological processes and biological diversity” and sustainable use of the country’s natural resources.</li> </ul>	<ul style="list-style-type: none"> <li>- Exploration activities to be conducted might negatively affect the environment if the proponent does not conduct the activities in a sustainable manner. It will therefore remain the responsibility of the proponent to implement all the stated measures and to abide to the legislation related to the project so as to safeguard the environment.</li> </ul>
<b>Environmental</b>	Environmental Management Act 7 of 2007	<ul style="list-style-type: none"> <li>- States that, projects with significant environmental impacts are subject to an environmental assessment process (Section 27).</li> <li>- Requires for adequate public participation during the environmental assessment process for interested and affected parties to voice their opinions on a project (Section 2).</li> </ul>	<ul style="list-style-type: none"> <li>- The stated project is listed under activities which require an EIA.</li> <li>- As stated in the act, adverts should be published in two local newspapers twice.</li> <li>- The public and relevant authorities should be consulted during the process of public participation as per the requirement of the act</li> <li>- The EMP which will guide on the management of the environment should be drafted as per the requirement of the act</li> </ul>
	EIA Regulations (2012)	<ul style="list-style-type: none"> <li>- Lists all activities, which cannot be undertaken without an EIA.</li> </ul>	<ul style="list-style-type: none"> <li>- This project is listed under mining and quarrying activities.</li> </ul>

			<ul style="list-style-type: none"> <li>- Activity 3.3 states that resource extraction, manipulation, conservation and related activities require an EIA.</li> </ul>
	Convention on Biological Diversity (1992)	- Article 1 lists the conservation of biological diversity amongst the objectives of the convention.	<ul style="list-style-type: none"> <li>- The area under study is under conservancies hence the need for the proponent to carry out the project in a sustainable manner such that the biodiversity of the area is not disturbed.</li> </ul>
	Nature Conservation Ordinance No. 4 of 1975	Chapter 6 provides for legislation regarding the protection of indigenous plants	<ul style="list-style-type: none"> <li>- The area of study has protected plants around hence the need of the proponent to protect the plants. Indigenous and protected plants should be incorporated within the development of the project.</li> </ul>
	Minerals (Prospecting and Mining) Act, 1992 (Act 33 of 1992)	To provide for the reconnaissance, prospecting and mining for, and disposal of, and the exercise of control over, minerals in Namibia; and to provide for matters incidental thereto. "mineral" means any substance, whether in solid, liquid or gaseous form, occurring naturally in, on or under any land and having been formed by, or subjected to, a geological process, excluding-(c) subject to the provision of subsection (2) , soil, sand, clay, gravel or	<ul style="list-style-type: none"> <li>- The intended activity involves exploration of minerals mainly copper ore.</li> </ul>

		stone (other than rock material specified in Part 2 of schedule 1) .	
<b>Soil</b>	Soil Conservation Act 6 of 1969	This act covers the prevention and combating of soil erosion; the conservation, improvement and manner of use of the soil and vegetation; and the protection of water sources	- Limited trenching will leave earthed soils hence it should not be left un-rehabilitated.
<b>Water</b>	Water Act 54 of 1956	- Prohibits the pollution of underground and surface water bodies.	- If drilling activities go below the level of the water table, they might be possibilities of pollution. Hence the pollution of water resources should be avoided during the exploration process.
<b>Health and Safety</b>	Labour Act (No 11 of 2007)	- This act emphasizes and regulates basic terms and conditions of employment, it guarantees prospective health, safety and welfare of employees and protects employees from unfair labour practices.	- Work related hazards which include noise, dust, stress might be encountered by employees during the exploration phase. - The proponent will therefore be obliged to create a safe working environment for the employees.
	Public Health and Environmental Act, 2015	- The act mainly emphasis on proper management of the environment, to prevent negative health impacts. - The act promotes proper waste management.	- Proper waste management should be promoted to prevent nuisance, which can consequently affect public health. - Recycling, reuse and reduce must be practised at all times thus if any waste is generated.
	Heritage Act	- The Heritage Act of 2004 makes provision for the developer to identify	- No known heritage sites overlay the EPLs however there might be unknown

		<p>and assess any archaeological and historical sites of significance. The existence of any such sites should be reported to the Monuments Council as soon as possible. The Council may serve notice that prohibits any activities as prescribed within a specified distance of an identified heritage/archaeology site.</p>	<p>archaeological remains within the EPLs hence the Proponent is required to conduct the chance find procedures and report immediately to Heritage Council.</p>
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**N.B:** *The Proponent shall be required to comply with the legislations. Where there is need to engage private consultants to facilitate compliance, the Proponent is encouraged to consult qualified and certified personnel. The Environmental consultant is supposed to conduct legal compliance audits and produce bi-annual reports, which will be required during renewal of environmental clearance certificate. The Proponent shall also be required to renew the permit from Heritage Council.*

## CHAPTER FIVE: DESCRIPTION OF THE AFFECTED ENVIRONMENT

This chapter describes the environmental setting of the project, which includes the biophysical environment and the socio-economic environment. The baseline information will assist in the monitoring of the environmental impacts during the exploration phase.

### 5.1 BIO-PHYSICAL ENVIRONMENT

#### 5.1.1 Climate

The average annual rainfall received around Sesfontein area is 300-350 mm per annum. Maximum temperatures can reach 34°C-36°C during the summer months. The area of Sesfontein like most parts of Namibia, has been greatly affected by climate change over the years such that rainfall pattern and amounts have changed. Table 5 below shows general climate data of Sesfontein area.

**Table 5:** General Climate Data

<b>Average Annual rainfall:</b>	Average rainfall in the area is between 300-350mm per year
<b>Variation in rainfall:</b>	Variation in annual rainfall is averaged to be 40-50 % per year
<b>Average evaporation:</b>	Average evaporation in the area is between 2240-2380mm per year.
<b>Precipitation:</b>	January-March receives high rainfall, with January being the wettest. June and July being the driest month
<b>Water Deficit:</b>	Average water deficit in the area is between 1700-1900mm per year.
<b>Temperatures</b>	Annual temperatures are 20-22 °C per year Average maximum temperature 34°C-36°C October- April its hot Average minimum temperatures 6°C-8°C Coldest month July
<b>Wind direction</b>	Wind directions in the area are predominantly from the south.
<b>Humidity</b>	Most humid month is March with 80%-90% and September being the least with 10%-20%

*(Source: Atlas of Namibia, 2002)*

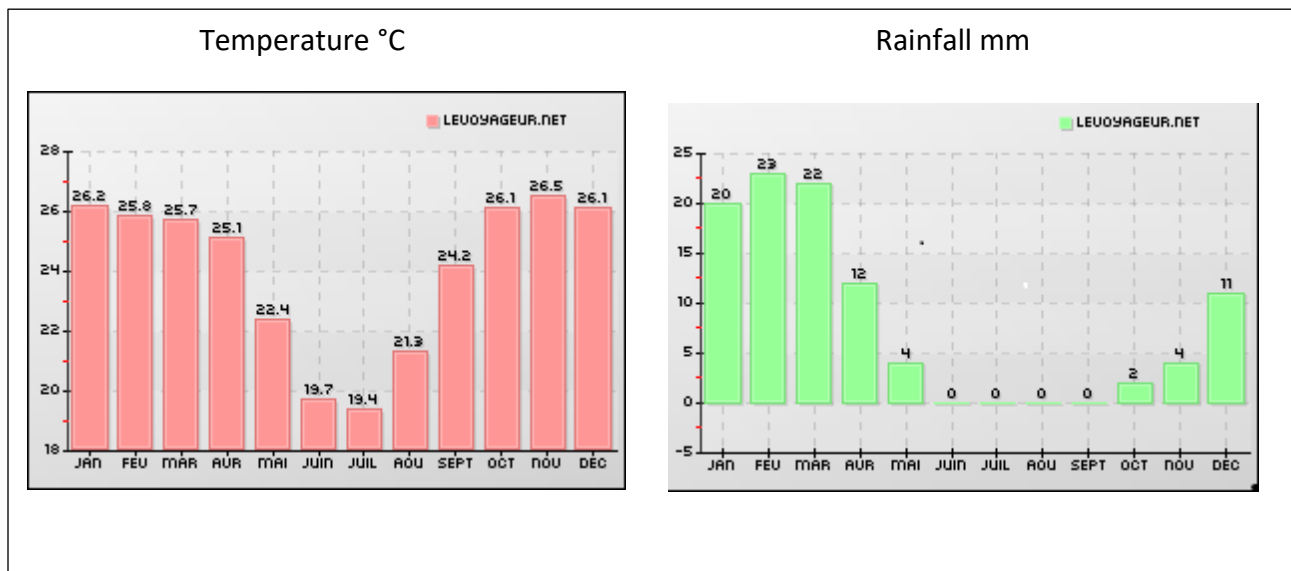


Figure 1: Sesfontein temperature and rainfall graphs

### 5.1.2 Topography, Soils and Geology

The elevation of the Region is 868m and of Sesfontein 570m above sea level. The area of Sesfontein is generally mountainous. The study area is mainly covered by lithic leptosols soil which are very thin and shallow hence classifying the relativity fertility of the soils to be low. Leptosols are coarse-textured soils which are characterized by their limited depth caused by the presence of a continuous hard rock. The leptosols are, therefore the shallowest soils to be found in Namibia and they often contain much gravel. Their water holding capacity is low and vegetation in areas in which they occur is often subject to drought (Mendelsohn 2000). Rates of water run-off and water erosion can be high when heavy rains fall.

The geology of the study area is limestone and dolomite as shown in **Appendix A, Hydrogeology Map**. See table 6 which shows geology of the EPLs and possible types of mineral deposits. Mendelsohn (2000) pointed that, besides diamond, all valuable minerals are found in the western side of the country. However, the common commodity within the EPLs is base and rare metals.

Table 6: Geology for the EPLs

EXCLUSIVE PROSPECTING LICENCE (EPL)	GEOLOGY	COMMODITIES
6773	<i>Lithology</i> : dolomite,limestone, shale,chert (Nt)	Base and Rare Metals, Dimesion Stone, Industrial Minerals, Precious Metals
7440	<i>Lithology</i> : dolomite,limestone, shale,chert (Nt) <i>Formation</i> : Namibian	Base and Rare Metals, Industrial Minerals, Precious Metals

7423	<i>Lithology</i> : dolomite,limestone, shale,chert (Nt) <i>Formation</i> : Namibian	Base and Rare Metals, Industrial Minerals, Precious Metals
7442	<i>Lithology</i> :phyllite,quartzite,schist,conglomerate (Nm), dolomite,limestone, shale,chert (Nt), dolomite,limestone,shale,quartzite (Na), diamictite,schist,iron formation,ortho-amphibolite,quartzite (Nc) <i>Formation</i> : Namibian, Chuos	Dimesion Stone, Non-nuclear fuel minerals
7718	<i>Lithology</i> :phyllite,quartzite,schist,conglomerate (Nm), dolomite,limestone, shale,chert (Nt), diamictite,schist,iron formation,ortho-amphibolite,quartzite (Nc) <i>Formation</i> : Namibian, Chuos	Base and Rare Metals,Dimesion Stone,Industrial Minerals,Precious Metals,Nuclear fuel minerals,Semi-precious stones

### 5.1.3 Hydrogeology

Generally, in Namibia there is not much water to be seen on the surface (Mendelsohn 2002). The little rain that falls evaporates, seeps into the ground, or is rapidly drained by ephemeral rivers. Surface water bodies near the EPLs is Hoanib River, which pass on the southern boundary of EPL 7423, **see Appendix A, Hydrogeology Map**. The Hoanib River is an ephemeral river. The area however has springs that provide water for animals and the villagers.

### 5.1.4 Vegetation of the study area

The study area is dominated by the western highlands vegetation type, **see Appendix A, Vegetation Map**. The Colophospermum mopane forms the main vegetation around the study area. For protected plant species obtained around the EPLs, see table 5.2 below. To note, the density of the vegetation has been affected over years due to poor rains.

**Table 7:** Protected plant species

Species Name	Tree Name	EPLs	Occurrence
Acacia Erioloba	Camel thorn/ kameeldoring	7440, 7442, 7423	Common to abundant
Albizia Anthelmintica	Worm-cure albizia/ Oumaboom		Common to abundant
		7718	Uncommon to rare occurrence
Berchemia Discolour	Bird Plum	6773, 7718	Uncommon to rare occurrence
Boscia Albitrunca	Shepherd's tree/ Witgat		Common to abundant
		7423, 7440, 7442,	Occasional occurrence
		6773, 7718	Uncommon to rare occurrence

Colophospermum mopane	Mopane	7440, 7442	Common to abundant
			Uncommon to rare occurrence
Sclerocarya birrea	Marula	6773, 7718	Uncommon to rare occurrence
Ziziphus mucronate	Buffalo thorn / Wag-'n-bietjie	6773, 7718	Uncommon to rare occurrence



**Image 1:** vegetation density around the study area

### 5.1.5 Fauna

Sesfontein is home to a diversity of large game, including elephant, giraffe, black rhino, Hartmann's mountain zebra, kudu, gemsbok, springbok, duiker, steenbok, klipspringer and ostrich. Large carnivores include lion, leopard, cheetah and caracal, spotted and brown hyaena and jackal. Animal farming in the form of cattle and small stock is mainly practiced in the



Sesfontein area. The density of cattle and small stock in the Sesfontein valley is amongst the highest in the Kunene Region, causing overgrazing and related erosion. However, Sesfontein faces the challenge of balancing farming activities with the environmental limitations of an arid ecosystem, as well as optimizing benefits from natural resources amongst a society with a long tradition of livestock herding. Another challenge remains of people coexisting with wild animals, especially the large predators and elephants.

#### **5.1.6 Archaeology**

The project area falls within Kaokoland in Kunene Region, northeast of Namibia. This section will therefore describe how the Proponent will handle any unknown heritage sites that might fall within the Proponent's EPLs. It is also worthwhile to note that currently there are no registered or declared heritage sites that fall within Kaoko Mining Namibia (Pty) Ltd.'s EPLs, see attached map below. In addition, previous archaeological work done around Kaokoland will also be discussed in brief.

According to the Heritage Act (27 of 2004), "heritage" is restricted to places and objects, including those of archaeological, cultural, historical, scientific and social significance. The act also defines "archaeological" as any remains of human habitation or occupation that are more than 50 years old found on or beneath the surface on land or in the sea, and especially notes rock art, being any form of painting, engraving or other representation on affixed rock surface or loose rock or stone which is 50 or more years old. It is essential to understand that the legal protection can extend beyond the archaeological object or site, to include the natural or existing condition or topography of land, as well as the trees, vegetation or topsoil. Kaoko Mining Namibia (Pty) Ltd shall therefore be responsible in persevering any archeological or heritage sites within their project area, in a case that they come across any. The Proponent shall bear in mind that, all archaeological objects are the property of the State and the ownership extends to all archaeological remains, known or unknown. It shall also be the responsibility of the Proponent to inform the exploration personnel and contractors about the legal status of archaeological remains and the obligation to report the discovery of any new archaeological remains to the National Heritage Council.

Apart from that, during the exploration phase, the exploration personnel should be observant given that they might come across archaeological evidence.

The following should be observed as they might be clues to archaeological evidence; stone artefacts and stone features sites (settlements and graves).

In addition, the exploration team should be aware that archaeological sites commonly occur in these locations; rock outcrops and inselbergs, saddles, drainage lines, pans and dune fields and gravel plains.

### **a) Brief History of Archaeological work around Kaokoland**

Archaeological work has been conducted around the Kaokoland area and significant archaeological evidence has been obtained. The most significant results in the Kaokoland were provided by excavations in a rock shelter, named Oruwanje 95/1 (Frank, in prep). Ovizorombuku 96/1 being another rock shelter was also excavated in 1998 (Vogelsang 1998). The stone artifact accumulation from the basal layers of this site were attributed to date back to an Early Holocene to Late Pleistocene **Age** (around 10,000 **B.P**). The second trench at the site Ovizorombuku 96/1 after excavation produced a sheep bone, coming from one of the final spits. A charcoal sample from this spit was dated about 2500 B.P.

Another site discovered was Omungunda 99/1 which is situated near Opuwo town. With an extension of approximately 23 x 4 m, Omungunda 99/1 is the largest rock-shelter in the region and it was the first site with rock paintings in the Kaokoland (Vogelsang 1998). In addition, around 1999 other sites Hartmann's (N99/3) and Marienfluss valleys (N99/5) located on top of hills, were discovered and they had stone circles, potsherds, glass-beads and an iron arrowhead. According to Vogelsang (1998), a first radiocarbon date from a fireplace inside one of the hut-circles had an age of 230 years hence corresponding with the suspected date of the immigration of the cattle keeping Himba people from Angola. Apart from that, several clusters of stone circles were also discovered at a granite hill close to the border of the Skeleton-Coast Park.

### **b) Declared Heritage Sites in the vicinity of the proposed development**

According to the data sourced from the website of National Heritage Council, there are six declared heritage sites in Kunene Region where Kaoko Mining Namibia (Pty) Ltd EPLs are located. See attached map below. Of the known heritage sites, none overlays any of the EPLs for Kaoko Mining Namibia (Pty) Ltd.

### **c) Unknown Heritage Sites**

It is essential to note that, within the EPLs, there might be unknown heritage sites. The Proponent will consult with the headman of the area before conducting any work as their knowledge will be of great importance in identifying some sites of significance such as their holy grounds and graves. In addition, given that the Proponent comes across unknown heritage sites within the EPLs, the Proponent will follow the following procedures:

*Action by person identifying archaeological or heritage material*

- If operating machinery or equipment, stop work
- Identify the site with flag tape
- Determine GPS position if possible
- Report findings to foreman

*Action by Foreman*

- Report findings, site locations and actions taken to superintendent
- Cease any work in immediate vicinity

*Action by superintendent*

- Visit site and determine whether work can proceed without damage to findings
- Determine and mark exclusion boundary
- Record coordinates for the site for confirmation by archaeologist

*Action by Archaeologist*

- Inspect site and confirm recorded coordinates
- Advise National Heritage Council (NHC) and request written permission to remove findings from work area
- Recover, package and label findings for transfer to National Museum

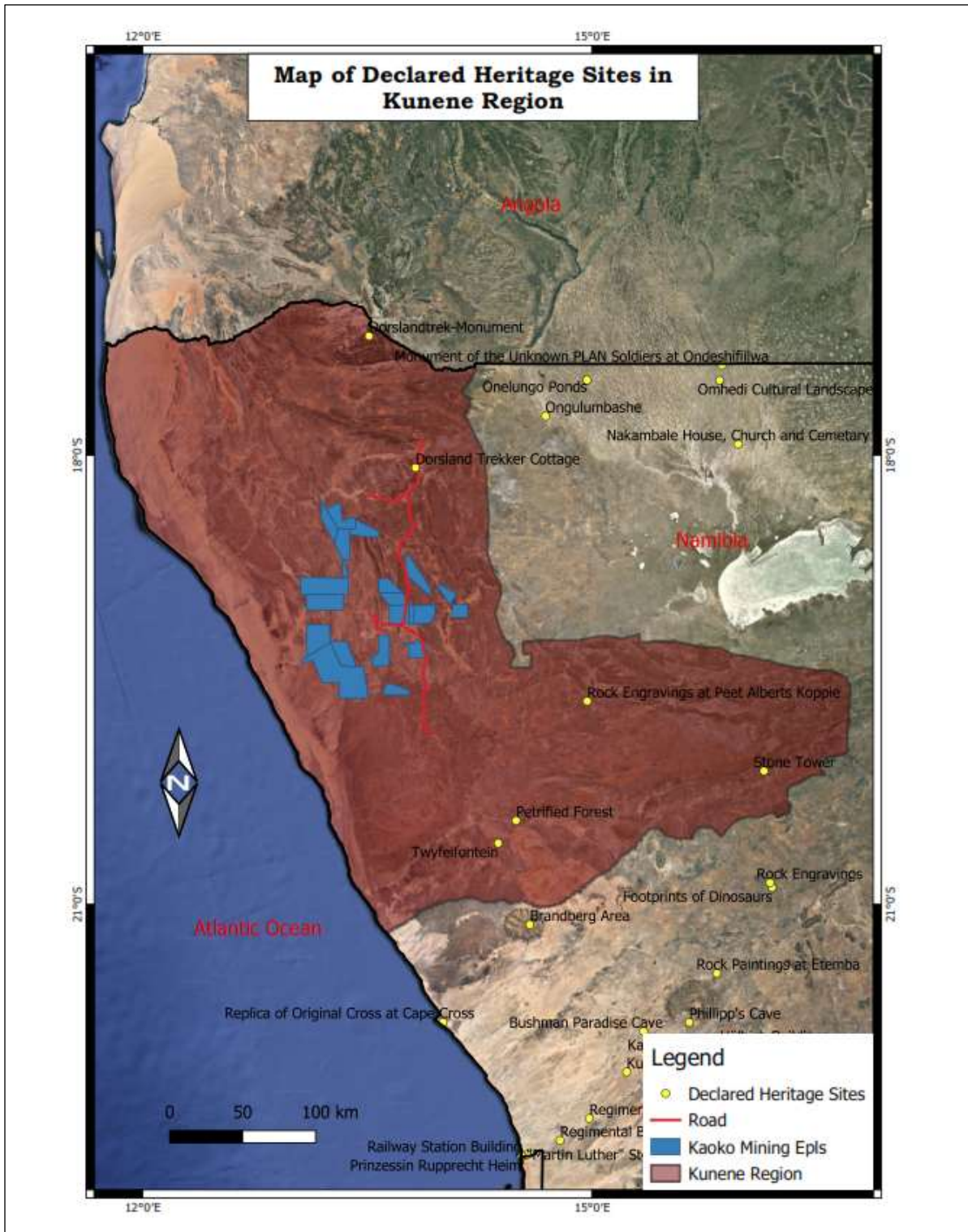
*In the event of discovering human remains:*

Action as above

- Field inspection by Archaeologist to confirm that remains are human
- Advise and liaise with NHC and Police
- Recover remains and remove to National Museum or National forensic Laboratory, as directed

**d) Management of “no-go areas”**

Currently there are no declared or registered heritage sites that overlap or coincide with our proposed project area, hence this section at the moment does not apply to this project.



**Figure 2:** Declared Heritage Sites in Kunene Region

## **5.2 SOCIO-ECONOMIC ENVIRONMENT**

Kunene Region is located on the northwest of Namibia and the Skeleton Coast Park forms its entire west coast on the Atlantic Ocean. The following six political constituencies comprises Kunene Region, Opuwo, Sesfontein, Epupa, Khorixas, Kamanjab and Outjo. Outjo is classified under municipality, Khorixas and Opuwo as towns, Kamanjab as a village. Sesfontein, Fransfontein and Okangwati have been proclaimed and targeted for urban development. Generally, the EPLs are surrounded by open spaces and mountains.

### **5.2.1 Population**

In the census that was conducted in 2011, the population for Kunene Region was 86 856 of which 43 253 are female and 43 603 are males (NPC 2011). According to NPC (2011), there was an increase in population from 2001 (68 735) to 2011 (86 856). In 2011, Kunene Region had a relatively young population, with about 42 percent of the whole population being less than 15 years of age hence it is vital to bring projects which create employment and empower the youths. Sesfontein area has a population of 8434 people, 4392 males and 4042 females (NPC 2011). By region, Kunene Region among the other regions has the lowest percentage of people living with HIV. By region it has 9.7% people living with HIV/AIDS (MHSS 2015).

### **5.2.2 Education Profile**

According to (EMIS, 2012) there are 41 Primary schools, 12 Combined school and 6 Secondary schools, in total there are 120 schools which is too low as compared to other regions. Of the 120 schools, 114 are state owned and 6 privately owned. 73 out of 838 teachers in Kunene Region are without training. Of the population aged 6 years and above in Kunene Region, 35.9 % never attended school, 50% left school and 9% are currently at school (NPC 2011). The major problem in the region is shortage of schools such that learners travel long distances to school which might be a factor to high dropouts in the region. In addition, another challenge is lack of proper teaching facilities and physical buildings to accommodate learners and teachers. Given the scenario above, if the project is to be implemented, the proponent should try to help the community as a social responsibility of the company.

### **5.2.3 Employment Opportunities**

According to NPC (2011), 64 % of the economically active population aged 15 years and above are employed and 36% unemployed in Kunene Region. Many people in the region rely on wages and salaries. According to NPC (2011), 32% of the population in the region relies on farming, 41% on wages and salaries, 5% on cash remittance, 8% on business and 12% on pension.

### **5.2.4 Tourism**

Sesfontein is one of the areas which is frequently visited by tourists and it owes its name to six springs that surface at the base of the hills, creating an oasis in the barren wastes of the Kunene Region. Prominent areas include the Fort Sesfontein lodge which was once a military outpost back in 1901. There is also the Sesfontein conservancy which was registered in 2003 and covers

2465km<sup>2</sup>. The landscape is a mix of hills, plains and wooded river valleys with the scenic Hoanib Valley and fountains. Wildlife includes elephant, leopard, lion, black rhino, cheetah and mountain zebra. Income is derived from conservation hunting and tourism.

## **CHAPTER SIX: PUBLIC PARTICIPATION**

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Public participation process is a fundamental principal of the EIA process and it involves engaging members of the public to express their views about a certain project. Section 2 of the Environmental Management Act (2007), states that public participation in decision-making affecting the environment shall be promoted and fair and equitable access to natural resources shall be promoted. The Environmental Management Act (No 7 of 2007), empowers the local community to participate in project conducted within their jurisdiction. During the public participation of the proposed exploration project, the following principals were used: inclusivity, transparency and relevance.

### **6.1 OBJECTIVES OF THE STAKEHOLDER CONSULTATION PROCESS**

The objectives of the public consultation are;

- To inform I&AP about the proposed activity and to give them the opportunity to express their views, concerns or opinions.
- To reduce conflict through early identification of contentious issues
- To gather potential negative and positive environmental impacts associated with the proposed project from the stakeholders' perspectives.
- To engage stakeholders for the effective mitigation and enhancement of negative and positive impacts arising from the proposed project respectively.

### **6.2 PRINCIPLES GOVERNING PUBLIC CONSULTATION**

The following principals were used during the public participation:

#### **6.2.1 Inclusivity**

Everyone was free to participate in the public participation process. The public was notified through the public notices and adverts from local newspapers, The Namibian and New Era. To ensure that all stakeholders were involved, the consultant compiled a list. Both locals, traditional authorities and Kunene Regional Council were conducted; **see Appendix B, letters sent to stakeholders.**

#### **6.2.2 Open and transparency**

The public participation process was open and transparency, the consultant took time to explain the background of the project highlighting both the positive and negative impacts associated with the project. All people who registered as Interested and Affected Parties were also given a BID and full document of the EIA was available upon request.

### 6.2.3 Relevance

During the whole process, the consultant remained focused on subjects related to the project. Interested and Affected Parties were supposed to make comments relating to socio-economic and environmental impacts associated with the project. Political and other non-related comments were considered not relevant.

### 6.3 NOTIFICATION OF INTERESTED AND AFFECTED PARTIES

The consultation was facilitated through the following means:

#### 6.3.1 Background Information Document (BID)

A BID was prepared and made available to Interested and Affected Parties. A BID is a short document, which briefly gives the background of the project. The main aim of distributing the BID to Interested and Affected Parties is to bring awareness and clarity about the proposed project. See **Appendix B**, copy of the BID.

#### 6.3.2 Advertisement

Adverts were placed in two local newspapers namely, The Namibian and New Era as shown in table 8 below.

**Table 8:** Details of public notification for the EIA study

Newspaper	Area of Distribution	Language	Date Placed
The Namibian	Country Wide	English	28 October 2019
The Namibian	Country Wide	English	4 November 2019
New Era	Country Wide	English	28 October 2019
New Era	Country Wide	English	4 November 2019
Site notices	Kunene Regional Council, Otwani Clinic	English	1 November 2019

(See Appendix B)

#### 6.3.3 Public Meeting

The public was informed about the meetings through the adverts made in The Namibian and New Era. The meetings were held on 2 November 2019 at Otwani Rural District Council (Otwani), Sesfontein Conservancy (Sesfontein) and Otjapitjapi village as shown on site images below. For more information on issues raised during the meetings, see **Appendix B, Meeting Minutes**.





**Image 2:** Public meeting at Sesfontein Conservancy



**Image 3:** Public meeting in Otjapitjapi village



**Image 4:** Public meeting at Otwani Rural District Council



### 6.3.5 Public Notices

Notices with project information were placed at Kunene Regional Council, Otwani Clinic and around the villages as shown on images below.

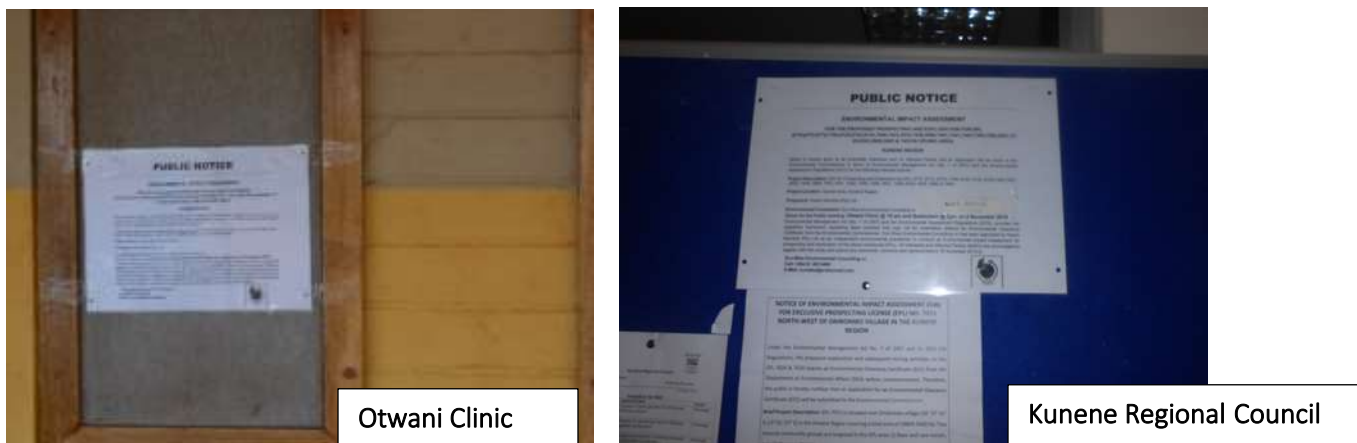


Image 5: Public notices

### 6.4 SUMMARY AND DISCUSSION OF STAKEHOLDERS CONSULTATION.

In summary, major issues brought forward by stakeholders included, employment creation, community development, communication between the proponent and the community, boundary issues and sustainability of the project on the environment.

#### 6.4.1 Response to stakeholder concerns

During the public participation process, all people viewed the project as beneficial to the community. For more issues raised during the public participation process, **see Appendix B, Meeting Minutes for both the three meetings**. In summary, the following major issues were brought forward:

##### a) Employment

Many participants recommended that locals be employed by the proponent. However, it is essential to note that during the exploration phase two people (geologist and assistant) will be employed permanently by Kaoko Mining Namibia Pty Ltd. During this phase, personnel with experience mainly in geology will be required hence the need to employ experienced staff. Therefore, during this phase, employment might not be created unless in cases whereby cut lines are created for accessibility to some areas. Employment will be mainly created in future thus during mining phase.

##### b) Relations with the community and communication

Mr. Elago Hamnjela (Administrative officer at Kunene Regional Council) also pointed out that, the company should remain friendly to the community and communication should always be maintained. Concerning this issue, the proponent promised to keep good relations with the community. The proponent also highlighted that if they get permission to start exploration activities, they will always notify the headman before working in their area. The proponent also

noted that communication with the headman will always be vital given that they will always want to know if there are any holy grounds in the area before any works.

**c) Joining the company**

Participants in Otjapitjapi village were mainly concerned about joining the company and registering their EPLs and mining claims. In response, the proponent indicated that for now its too late as the EIA is already underway.

**d) Community development**

Traditional authorities were mainly concerned about community development. Headmen Petrus Ganuseb of Sesfontein and Chief Kaenda Herunga of Otjikukutu emphasized development of the community. Given that the proponent decides to conduct mining activities in future, social responsibilities should be fulfilled.

**e) Encroachment of boundaries**

Another issue which was raised during the public meeting was encroaching boundaries. It is essential to note that the proponent shall not be allowed to encroach on other EPLs which are not part of their sites. The proponent shall use maps and GPS to see the boundaries of their EPLs.

**f) Project description**

Mr. Wassenaar emailed requesting the kml file and it was sent to him. He further required clarification on the exploration activities to be done. See Appendix B, response. It is essential to note that, it was decided that both methods which are limited trenching and drilling will be used. Trenching will only be used to understand the surface geology and drilling will be used to understand the subsurface geology. Limited trenching will only be done after the geologist confirms that there is potential ore deposits basing on reconnaissance study. This implies that no unnecessary trenching shall be done. If the proponent, implement all the stated mitigation measures and abide to the relevant legislations to the project, there will be minimum harm to the environment.

**6.4.2 Stakeholders' Recommendations**

Conducted traditional authorities recommended the project to go ahead but the proponent was tasked to employ locals and bring development to the community.

**CHAPTER SEVEN: ASSESSMENT OF ENVIRONMENTAL IMPACTS**

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This chapter will look on the potential impacts both negative and positive. Mitigation measures will be proposed so that the proponent may carry out the process in an environmentally sound manner. Public participation, site visit and professional experience were the methodologies used to identify the potential impacts.

## 7.1 IDENTIFICATION OF POTENTIAL IMPACTS OF THE PROJECT

### Positive Impacts

- Local empowerment
- Employment creation.
- Community development
- Land utilization for the benefit of people

### Negative impacts

- **Air Environment**
- Dust
- Noise
- **Land Environment**
- Impact on landscape
- Vegetation loss
- Generation of waste
- Impact on fauna
- Impact on soil
- **Water Environment**
- Impact on surface and groundwater sources
- **Socio -Economics**
- HIV/AIDS
- Occupational Health and Safety risks.
- Heritage impact
- Population influx
- **Indirect Impacts**
- Cumulative impacts

## 7.2 IMPACT ANALYSIS

In this section, the impacts of the proposed project on human and biophysical environment are evaluated and analyzed. Following the identification of the various potential environmental impacts, the impact analysis framework looked at the impacts under the following categories;

**Table 9:** Ranking Matrix

	<b>Temporal scale</b>		<b>Score</b>	
<b>EFFECT</b>	Short term	Less than 5 years	1	
	Medium term	Between 5 and 20 years	2	
	Long term	Between 20 and 40 years (a generation) and from a human perspective almost permanent.	3	
	Permanent	Over 40 years and resulting in a permanent and lasting change that will always be there.	4	
	<b>Spatial Scale</b>			
	Study area	The proposed site /within immediate area of the activity	1	
	Beyond project boundary	Surrounding area outside the project boundary	2	
	Regional	District and Provincial level	3	
	National	Country	4	
	International	Internationally	5	
		<b>Severity</b>	<b>Benefit</b>	

	Slight/Slightly Beneficial	Slight impacts on the affected system(s) or party(ies)	Slightly beneficial to the affected systems(s) or party(ies)	1
	Moderate/Moderately Beneficial	Moderate impacts on the affected system(s) or party(ies)	An impact of real benefit to the affected system(s) or party (ies)	2
	Severe/Beneficial	Severe impacts on the affected system(s) or party(ies)	A substantial benefit to the affected system(s) or party(ies)	4
	Very Severe/Very Beneficial	Very severe change to the affected system(s) or party(ies)	A very substantial benefit to the affected system(s) or party(ies)	8
	<b>Likelihood</b>			
<b>LIKELIHOOD</b>	Unlikely	The likelihood of these impacts occurring is slight		1
	May occur	The likelihood of these impacts occurring is possible		2
	Probable	The likelihood of these impacts occurring is probable		3
	Definite	The likelihood is that this impact will definitely occur		4

**Table 10:** Ranking matrix for Environmental Significance

<b>Environmental Significance</b>		<b>Positive</b>	<b>Negative</b>
<b>LOW</b>	An acceptable impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent development.	4-7	4-7
<b>MODERATE</b>	An important impact, which requires mitigation. The impact is insufficient by itself to prevent the implementation of the project but which, in conjunction with other impacts may prevent its implementation.	8-11	8-11
<b>HIGH</b>	A serious impact, which, if not mitigated, may prevent the implementation of the project. These impacts would be considered by society as constituting a major and usually long-term change to the natural and/or social environment and result in severe negative or beneficial effects.	12-15	12-15

<b>VERY HIGH</b>	A very serious impact, which may be sufficient by itself to prevent the implementation of the project. The impact may result in permanent change. Very often, these impacts are unmitigable and usually result in very severe effects or very beneficial effects.	16-20	16-20
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**Table 11:** Matrix to show environmental significance

	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	4	5	6	7	8	9	10	11	12	13	14	15	16	17
2	5	6	7	8	9	10	11	12	13	14	15	16	17	18
3	6	7	8	9	10	11	12	13	14	15	16	17	18	19
4	7	8	9	10	11	12	13	14	15	16	17	18	19	20

### 7.3 IMPACT EVALUATION

#### 7.3.1 Negative impacts associated with exploration phase:

##### 1. Impact on landscape

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Impact on landscape Unmitigated</b>	Short term	1	Study area	1	Moderate impact	2	Definite	4	8
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur	2	5

Exploration activities such as limited trenching and drilling will disturb the original landscape. Rocks and top soil will be disturbed such that this will cause alternation of existing landscape. However, less harm is expected during the exploration phase given that trenching shall be limited and done at a small scale with the use of shovels and picks. No machinery shall be used during trenching and it shall only be used to understand the surface geology. If mitigation measures are implemented, the impact is expected to be of low environmental significance.

#### Mitigations and recommendation

- Limited trenching should be done to understand the surface geology but when need arise to understand the subsurface geology, drilling should be used.
- Removed rocks and soil should be replaced back and levelling of the area done so as to try to restore the area to its natural state.

## 2. Dust

Identified Impact	Effect						Risk Likelihood	or Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
<b>Dust Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	Probable	3	6
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur	2	5

The access roads are gravel roads hence dust is expected to be generated during movement of vehicles. Dust is likely to be produced also during limited trenching and drilling. Dust generated during the works is expected to affect the study area and not escape the boundaries. Employees working in the area are the ones who might be at risk hence they are expected to cover themselves with dust masks to avoid contracting diseases like pneumoconiosis. The impact is however expected to be of low environmental significance.

### Mitigations and recommendation

- Soil watering when soil works are being executed and where dust is emitted
- People at site should be provided with respirators
- Regular monitoring and review to ensure safe operation

## 3. Noise impact

Identified Impact	Effect						Risk Likelihood	or Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact	Score			
<b>Noise Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	Probable	3	6
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur	2	5

The following might produce noise during the exploration phase; drilling machine and frequenting vehicles. Noise generated is not expected to affect outside the boundaries of the EPLs. Noise generated might affect employees working at the site hence posing a risk of ear damage. The normal levels of 55 decibels recommended by World Health Organization (WHO) might be surpassed during the exploration phase. Drilling machines can produce noise of 95- 100 decibels. However, the impact of noise will remain of low environmental significance if mitigation measures are implemented.

**Mitigations and recommendation**

- A drilling interval should be established, used and adhered to and working hours should be limited to minimum of 8 hours per day
- Noise should be addressed and mitigated at an early stage.
- Proper and timely maintenance of machineries and vehicles
- Employees should be equipped with ear protection equipment

**4. Disturbance of vegetation**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Disturbance of vegetation Unmitigated</b>	Medium term	2	Study area	1	Slight impact	1	May occur	2	6
<b>Mitigated</b>	Medium term	2	Study area	1	Slight impact	1	May occur	2	6

Vegetation loss might be experienced when creating the cutlines and vegetation might be disturbed during drilling and limited trenching. The severity of the impact is expected to be slight given that the proponent will use existing roads and in cases that the roads need improvement, they will be upgraded. No new roads will be established but cutlines might only be created for accessibility of exploration vehicles thus when there is need. The study areas do not have dense vegetation, the areas are rocky. Droughts over the years have also affected the density and growth of vegetation in the area. It is essential to note that, the EPLs are located within conservancies and within the EPLs there are protected plants hence the Proponent should make sure that the plants are conserved by not cutting them.



**Mitigations and recommendation**

- Protected plant species should not be removed but preserved and the activities should fit into the environment without affecting the protected trees.
- Massive clearing shall not be allowed

**5. Impact on soil**

Identified Impact	Effect				Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Severity of impact			
<b>Soil Unmitigated</b>	Short term	1	Study area	Moderate impacts	Definite	4	8
<b>Mitigated</b>	Short term	1	Study area	Slight impacts	Definite	4	7

It is definite that soil shall be disturbed by exploration activities such as drilling and limited trenching. Soil might also be partly affected by oil or fuel leakages from vehicular and drilling machines. The impact is expected to affect only the study area.

**Mitigations and recommendation**

- After completion of exploration activities such as trenching, removed soil layers must be replaced and levelling must be done so that the original condition is restored.
- Proper care should be taken so that there is no spill that would cause soil contamination
- If any hazardous waste is produced it should be properly handled and sent for disposal to appropriate disposal areas
- Fuels shall not be kept/stored at the site

**6. Impact on surface and groundwater sources**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Surface &amp; groundwater Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur	2	5
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

Surface water bodies near the EPLs is Hoanib River which passes on the south boundary of EPL 7423. To note, Hoanib River is an ephemeral river. There will be no storage of oils and fuel on site, however there is risk of leakage of hydrocarbons from vehicles engines and drilling machine which may result in environmental contamination.

**Mitigations and recommendation**

- Storage of oils and fuel on site shall not be allowed.
- Implement a maintenance programme to ensure all vehicles, machinery and equipment remain in proper working condition and maintenance should be conducted in designated areas only, preferably off-site.
- Waste oils and fuels from drip trays on stationery vehicles and machinery should be disposed of as hazardous waste at a licensed facility by a specialist hazardous waste handler.

**7. Impact on fauna**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Impact on fauna Unmitigated</b>	Short term	1	Study area	1	Moderate impact	2	Definite	4	8
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur	2	5

The area has a diversity of wildlife. Exploration activities; walking around, trenching and drilling might result in loss for animal habitancy. Noise generated from these activities might scare away animals. In addition, wild animals might also be at risk if exploration personnel practice poaching activities for meat.

**Mitigations and recommendation**

- Working hours should be limited to during the day, thus enabling the wildlife to roam freely at night.
- No massive clearance shall be allowed

**8. Generation of Waste**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Generation of waste Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	Definite	4	7
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

Waste might be generated from unearthed rocks and soil, oils, fuel, food leftovers, papers and plastics. It is definite that waste will be generated from unearthed rocks and soil but if mitigation measures are implemented such as making sure that after completion of exploration activities such as trenching, removed soil layers are replaced and levelling are done so that the original condition is restored, the impact will be of low environmental significance.

**Mitigations and recommendation**

- Contaminated wastes in the form of soil, litter and other material must be disposed off at an appropriate disposal site.
- Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts

- After completion of exploration activities such as trenching, removed soil layers and rocks must be replaced and levelling must be done so that the original condition is restored.

### 7.3.2 Negative socio-economic impacts associated with exploration phase:

#### 1. Occupational Health and Safety Risks

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>O.H.S Unmitigated</b>	Short term	1	Study area	1	Moderate impacts	2	May occur	2	6
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	Unlikely	1	4

OHS hazards which might be experienced include noise, dust and occupational stress. People at risk will be employees. Dust emitted during trenching and drilling can cause pneumoconiosis to employees thus if they are exposed to it for prolonged periods and noise can cause ear damage. Moreover, work pressure on employees can cause stress hence resulting into accidents.

#### Mitigations and recommendation

- Conduct Hazard identification and risk assessments
- Comply with all Health and Safety standards specified in the Labor Act.
- Provide all staff on site with protective equipment (helmets, gloves, respirators, work suits, earplugs, goggles and safety shoes where applicable).
- Use of dust suppression measures
- Reduce noise exposure by isolating noisy equipment and rotate tasks
- Provision of the following, First Aid at the site, safety posters at conspicuous places and immediate accident/incident investigation reporting.

## 2. Population Influx

Identified Impact	Effect					Score	Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact					
<b>Population Influx Unmitigated</b>	Short term	1	Beyond project boundary	2	Slight impact	1	May occur		2	6
<b>Mitigated</b>	Short term	1	Beyond project boundary	2	Slight impact	1	Unlikely		1	5

The impact is expected to be of short term and also to extend outside the boundary of the project given that the employees will have to be accommodated outside the study area. The population influx is expected to be low given that the proponent is expecting to hire few people. The stage of exploration is not labor intensive as compared to mining. The proponent will hire two permanent employees (geologist and assistant to the geologist), contractors for drilling and locals for manual labor when the need arises. Therefore, the impact of population influx is expected to remain of low environmental significance.

### Mitigations and recommendation

- Local employment should be a priority so as to reduce the number of outsiders entering Sesfontein area.

## 3. Heritage impact

Identified Impact	Effect					Score	Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact					
<b>Heritage impact Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur		2	5
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	Unlikely		1	4

At the sites, there are no known heritage areas or artefacts deemed to be impacted by the exploration activities. However, the proponent is required to consult with the headman of the area before any work is done so that if there are any areas which are holy or with graves, the proponent would be aware. In addition, if the proponent come across archaeological features or objects that possess cultural values (e.g. Pottery, bones, shells, ancient clothing or weapons, ancient cutlery, graves etc.), the area should be barricaded off and the relevant authorities should be contacted immediately.

**Mitigations and recommendation**

- The Proponent should consult the headman of the area before conducting any work.
- All works are to be immediately ceased should an archaeological or heritage resource be discovered.
- The National Heritage Council of Namibia (NHCN) should advise with regards to the removal, packaging and transfer of the potential resource.

**4. Risk and spread of HIV/AIDS**

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>HIV/AIDS Unmitigated</b>	Short term	1	Regional	3	Severe impact	4	May occur	2	10
<b>Mitigated</b>	Short term	1	Beyond project boundary	2	Slight impact	1	Unlikely	1	5

Even though a few employees will be employed during this phase but the virus might still spread. The fact that people will be coming from different locations and meeting at one place can result in anti-social behaviours like prostitution hence the spread of HIV/AIDS. If mitigation measures are implemented, it will be unlikely that the virus will spread and the impact will be of low significance.

**Mitigations and recommendation**

- Employer should allocate time for employees to visit their families.
- Free distribution of condoms

### 5. Cumulative Impacts

Identified Impact	Effect					Score	Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact					
<b>Cumulative impacts Unmitigated</b>	Short term	1	Study area	1	Slight impact	1	Probably		3	6
<b>Mitigated</b>	Short term	1	Study area	1	Slight impact	1	May occur		2	5

Alternation of existing landscape caused by limited trenching and drilling might impact on unknown archaeological heritage and also result in loss of habitancy for some animals which can further affect the food web. The greatest potential impact of the proposed development on the archaeological heritage of the surrounding landscape will be during the removal of topsoil during limited trenching and drilling on identified areas of interest with possible mineral deposits. The proposed works will have a negative archaeological impact on undisturbed areas of ground where topsoil will be removed.

#### Mitigations and recommendation

- Limited trenching should be done to understand the surface geology but when need arise to understand the subsurface geology, drilling should be used.
- The Proponent will need to monitor, by seeking consultation from an archaeological consultant during topsoil removal over relatively large areas so as to ensure the full recognition and recording of any buried finds or features.
- Removed rocks and soil should be replaced back and levelling of the area done so as to try to restore the area to its natural state

### 7.3.3 Positive impacts associated with the project

#### 1. Employment creation

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Employment creation Unmitigated</b>	Short term	1	National	4	Very beneficial	8	Definite	4	17
<b>Mitigated</b>	Short term	1	National	4	Very beneficial	8	Definite	4	17

It is definite that jobs will be created during the exploration phase. The type of jobs will range from skilled, semi-skilled and unskilled and locals will definitely be recruited when manual labour is required.

#### 2. Local Empowerment

Identified Impact	Effect					Risk Likelihood	or	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Local Empowerment Unmitigated</b>	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19
<b>Mitigated</b>	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19

The shareholders of Kaoko Mining Namibia (Pty) Ltd are all Namibian citizens who managed to group their licenses together in a bid to explore for the possible discovery of a medium to large minable copper deposit. If the deposits are discovered in future, the shareholders and those who depend on them will benefit as long as the mine is operating.



**3. Land utilization for the benefit of people**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Land utilization for the benefit of people Unmitigated</b>	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19
<b>Mitigated</b>	Permanent	4	Regional	3	Very beneficial	8	Definite	4	19

Locals were granted the EPLs but most of the shareholders did not have funds to start exploration activities. Therefore, the formation of the company helped most of the shareholders. Given that exploration activities are done and minable deposits are obtained, this can result in utilisation of the land hence benefiting the people.

**4. Generation of Revenue**

Identified Impact	Effect					Score	Risk or Likelihood	Score	Overall Significance
	Temporal Scale	Score	Spatial Scale	Score	Severity of impact				
<b>Revenue Unmitigated</b>	Permanent	4	National	4	Very beneficial	8	Definite	4	20
<b>Mitigated</b>	Permanent	4	National	4	Very beneficial	8	Definite	4	20

Kaoko Mining Namibia (Pty) Ltd will pay tax hence generating revenue. More taxes will also be generated through contracted and subcontracted companies.

#### **7.3.4 Post-Exploration Phase**

The stage of exploration is expected to have minimum damage to the environment as compared to mining. However, pits created during limited trenching need to be rehabilitated. The following shall be done as a way to restore the environment:

- All pits shall be backfilled or contoured to a stable angle of repose.
- Stockpile disturbed bedrock on site in a safe and stable manner.

#### **7.4 SUMMARY & ANALYSIS OF IMPACTS**

During the exploration phase, the following impacts will fall under moderate environmental impacts if no mitigation measures are put in place; impact on landscape, soil, fauna and HIV/AIDS. However, if the project is well managed and the proposed mitigation measures are implemented accordingly, all the identified impacts will present minimum or no harm to the environment and to local people.

### **CHAPTER EIGHT: ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN**

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Environmental planning and management as a concept seek to improve and protect environmental quality for both the project site and the locality area through segregation of activities that are environmentally incompatible. EMP is a vital output for an Environmental Impact Assessment as it provides a checklist for project monitoring and evaluation.

Environmental Management Plan (EMP) for the proposed project is aimed at providing a logical framework within which identified negative environmental impacts can be mitigated and monitored. **See Appendix D, for the EMP.**

### **CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS**

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#### **9.1 CONCLUSION**

In the past, researches have been done on environmental impact assessment associated with exploration activities. However, knowledge gap remains on this project given that no EIA has been done earlier before. It was therefore, very essential to have a profound research and a critical analysis on the Environmental Impact Assessment for exploration activities in relation to the proposed area of development.

From the foregoing analysis, the social and economic rating for this project is positive. The project will not pose any serious negative environmental impacts if the EMP is effectively implemented. Should the proponent implement all the suggested mitigation measures, the consultant recommends the issuance of the Environmental Clearance Certificate.

## **9.2 RECOMMENDATIONS**

The following recommendations have been brought forward:

- Unnecessary clearing of vegetation shall not be allowed unless when the need arise to create cutlines for accessibility of vehicles.
- After exploration activities, the Proponent should rehabilitate the area by backfilling the pits or contour to a stable angle of repose
- Environmental audits by an independent environmental consultancy must be carried out during the exploration phase to monitor environmental compliance. The monitoring and audit reports should accompany the application for renewal of the environmental clearance certificate after 3 years.

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